

Claims

What is claimed is:

1. A method for detecting an object of interest in an image processing system, the method comprising the steps of:

- 5           generating a difference image;  
            segmenting the difference image into a plurality of regions;  
            identifying one or more silhouette candidates in at least a subset of the regions; and  
10           detecting the object of interest based at least in part on the identified silhouettes.

2. The method of claim 1 wherein the object of interest comprises a moving person.

3. The method of claim 1 wherein the difference image comprises a thresholded difference image generated by taking a difference between a first image and a second image and applying binary thresholding to the resulting difference.

4. The method of claim 1 wherein the difference image is segmented into a plurality of regions such that each of the regions are bounded by one or more vertical lines passing through the entire image.

5. The method of claim 1 wherein each of the regions of the image which includes a silhouette candidate includes only a single silhouette candidate.

6. The method of claim 1 further including the step of determining saliency values for each of the silhouette candidates using tensor voting.

5        7. The method of claim 2 further including the step of detecting a neck position of the moving person by analyzing a sum of x-components of tangents along a corresponding silhouette.

10       8. The method of claim 7 further including the step of utilizing the detected neck position to determine at least one of a head position and a head size for the moving person.

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15       9. An apparatus for detecting an object of interest in an image processing system, the apparatus comprising:

a camera; and

a processor coupled to the camera and operative (i) to generate a difference image from a signal received from the camera; (ii) to segment the difference image into a plurality of regions; (iii) to identify one or more silhouette candidates in at least a subset of the regions; and (iv) to detect the object of interest based at least in part on the identified silhouettes.

25       10. The apparatus of claim 9 wherein the object of interest comprises a moving person.

30       11. The apparatus of claim 9 wherein the difference image comprises a thresholded difference image generated by taking a difference between a first image and a second image and applying binary thresholding to the resulting difference.

12. The apparatus of claim 9 wherein the difference image is segmented into a plurality of regions such that each of the regions are bounded by one or more vertical lines passing through the entire image.

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13. The apparatus of claim 9 wherein each of the regions of the image which includes a silhouette candidate includes only a single silhouette candidate.

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14. The apparatus of claim 9 wherein the processor is further operative to determine saliency values for each of the silhouette candidates using tensor voting.

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15. The apparatus of claim 10 wherein the processor is further operative to detect a neck position of the moving person by analyzing a sum of x-components of tangents along a corresponding silhouette.

16. The apparatus of claim 15 wherein the processor is further operative to utilize the detected neck position to determine at least one of a head position and a head size for the moving person.

17. The apparatus of claim 9 wherein the image processing system comprises a video conferencing system.

18. The apparatus of claim 9 wherein the image processing system comprises a video surveillance system.

19. The apparatus of claim 9 wherein the image processing system comprises a human-machine interface.

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20. An article of manufacture comprising a storage medium for storing one or more programs for detecting an object of interest in an image processing system, wherein the one or more programs when executed by a processor implement the steps of:

generating a difference image;

segmenting the difference image into a plurality of regions;

10 identifying one or more silhouette candidates in at least a subset of the regions; and

detecting the object of interest based at least in part on the identified silhouettes.